NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CONSERVATION CROP ROTATION

(Acre)

CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

1. Reduce sheet and rill erosion.
2. Reduce soil erosion from wind.
3. Maintain or improve soil organic matter content and tilth.
4. Manage deficient or excess plant nutrients.
5. Manage plant pests (weeds, insects, and diseases).
6. Provide food for domestic livestock
7. Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown, except:

This standard does not apply to pastureland, hayland, or other land uses where crops are grown occasionally only to facilitate renovation or reestablishment of perennial vegetation.

CRITERIA

General Criteria Applicable To All Purposes Named Above

1. Crops shall be grown in a planned, recurring sequence except as outlined in Plans and Specifications.
2. Crops shall be adapted to the climatic region and the soil resource. Use adapted crops and varieties, listed in Ohio Agronomy Guide and the Ohio State University Crop Performance Publications.
3. A conservation crop rotation may include crops planted for cover or nutrient enhancement.
4. Crops shall be selected that produce sufficient quantities of biomass at the appropriate time to reduce erosion by water or wind to within acceptable soil loss levels. In those instances where crops

selected do not produce sufficient biomass to meet this criteria, a cover crop (see Cover Crop, 340) or other appropriate practices shall be used. The amount of biomass needed shall be determined using current approved erosion prediction technology. Soil loss estimates shall account for the effects of other practices in the conservation management system.

Additional Criteria To Maintain Or Improve Soil Organic Matter Content

1. Crops shall be selected that produce the amount of plant biomass needed to maintain or improve soil organic matter content, as determined using the current approved Soil Conditioning Index Procedure or Ohio soil Health Card or determined by approved research.

2. If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the desired soil organic matter content goal.

3. Cover and green manure crops planted specifically for soil improvement may be grazed, as long as grazing is managed to retain adequate biomass.

4. Crops shall be selected that produce an average amount of 5,500 pounds/acre/year or more of surface plant biomass during the planned crop rotation. Use the following table for determining residue amounts based on crop and yield:

Corn/Sorghum	56 lb/bu
Wheat	100 lb/bu
Rye	84 lb/bu
Oats	64 lb/bu
Soybeans	90 lb/bu
Barley	70 lb/bu
Corn Silage	72 lb/ton
Hay/Pasture (2-6 ton/ac)	7000 lbs/ac/yr
Small Grain Cover Crops killed/tilled:	
@ 10-15”	1500 lbs/ac
@ After boot/head stage	3000 lbs/ac
Tobacco	500 lbs/ac
Vegetable Crops	1500 lbs/ac

Manure = 1 lb. dry weight = 1 lb biomass

If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the average annual amount or 5,500 lbs/ac/yr.

Additional Criteria To Manage the Balance of Plant Nutrients

1. Crop selection and sequence shall be determined using an approved nutrient balance procedure.

2. When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with nitrogen-depleting crops.

3. To reduce excess nutrients, crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients shall be grown.

Additional Criteria To Manage Plant Pests (Weeds, Insects, Diseases)

1. Crops shall be alternated to break the pest cycle and/or allow for the use of a variety of control methods. Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest.

2. Resistant varieties, listed in appropriate university publications or other approved sources, shall be selected where there is a history of a pest problem.

Additional Criteria To Provide Food For Domestic Livestock

Crops shall be selected to balance the feed supply with livestock numbers. The needed amount of selected crops shall be determined using an approved forage-livestock balance procedure or information provided by the producer.

Additional Criteria To Provide Food And Cover For Wildlife

Crop selection to provide either food or cover for the targeted wildlife species will be grown, managed, or left unharvested as per the needs of the targeted wildlife as determined by an approved habitat evaluation procedure.

CONSIDERATIONS

1. When used in combination with CROSS WIND STRIPCROPPING (589B) or STRIPCROPPING CONTOUR (585), the crop sequence should be consistent with the stripcropping design.

2. When used in combination with RESIDUE MANAGEMENT practices, selection of high residue producing crops and varieties, use of cover crops and adjustment of plant population and row spacing can enhance production of the kind, amount, and distribution of residue needed.

3. Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by managing crop residues, tillage practices, utilizing animal wastes, or applying mulches to supplement the biomass produced by crops in the rotation.

4. Where excess plant nutrients or soil contaminants are a concern, utilizing deep rooted crops or cover crops in the rotation can help recover or remove the nutrient or contaminant from the soil profile.

5. Where precipitation is limited, seasonal or erratic moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation. Where winter precipitation occurs as snow, additional moisture can be obtained for crop use by trapping snow with standing residue, windbreaks, or other barriers.

6. Where improving water use efficiency on deep soils is a concern, rotating or combining deep-rooted crops with shallow rooted crops can help utilize all available water in the soil profile.

7. Crop damage by wind erosion can be reduced with this practice by selecting crops that are tolerant to abrasion from wind blown soil or tolerant to high wind velocity. If crops sensitive to wind erosion damage are grown, the potential for plant damage can be reduced by crop residue management, field windbreaks, herbaceous wind barriers, intercropping, or other methods of wind erosion control.

8. Where pesticides are used, consider application methods and the crop rotation to avoid negative impacts on the following crop due to residual herbicides in the soil or adverse affects on aquatic wildlife or habitat through runoff.

9. Soil compaction can be reduced by adjusting crop rotations to include deep rooted crops that are able to extend to and penetrate the compacted soil layers, as well as avoiding crops that require field operations when the soils are wet.

10. Leaving several rows unharvested around the edges of the field will provide protection and/or food for overwintering wildlife.

11. Crop plantings may be developed to benefit particular communities, species or life stages of wildlife. Food plots or crops for wildlife could be provided as part of a habitat restoration project as an initial food and cover source for wildlife until food and cover producing vegetation becomes established.

12. Crop residues may be a valuable food source for wintering wildlife where winter browse is sparse.

13. Careful consideration should be given to pesticide use if applied to crops raised for wildlife.

14. This practice has the potential to have either a positive or negative affect National Register listed or eligible (significant) cultural resources (archeological, historic or traditional cultural properties). Care should be taken, especially during site preparation and maintenance, to avoid adverse effects to these resources. Follow NRCS state policy for considering cultural resources during planning and maintenance.

PLANS AND SPECIFICATIONS

1. Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications should include the sequence of crops to be grown, length of time each crop will be grown and total length of rotation.

2. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. See the last page of this standard for the minimum documentation required.

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.

References:

National Standard Conservation Crop Rotation (328) February 2000
Agricultural Handbook Number 703
Soil Condition Index Spreadsheet
National Agronomy Manual

Practice Documentation For:	*Conservation Crop Rotation - 328*

The following documentation must be in the case folder or engineering subfolder.

Practice Planning

1. Is the practice part of a conservation plan?
2. Have the purpose(s) for the practice been identified?
3. Is the location of the practice identified on a map or plan drawing?

Practice Design

Have the following design criteria been addressed?

1. The proper ratio of high residue producing crops.
2. Crops compatible with the needs of the decisionmaker and the soil.
3. Crops are compatible with supporting conservation practices that make up the system.
4. Crops support the planned purpose(s) e.g. erosion control, soil tilth, pest management, nutrient management, etc.
5. Suitable crop substitutes that can be used for special market situations or weather conditions.

Practice Installation / Application

Does the practice meet the minimum criteria for the planned purpose(s)?

Have the following criteria been documented in the assistance notes or practice jobsheet?

1. Crops grown in the rotation and the field.
2. The crop(s) grown for a sufficient time to establish a rotation system.
3. The rotation meets the planned purpose and the decisionmaker's objectives.
4. Acres of conservation crop rotation applied.

Practice Deficiencies

If applicable, have the practice deficiencies been communicated with the decisionmaker?

Practice Maintenance

Have the following maintenance actions been communicated to the decisionmaker?

1. Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons.
2. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.

Other Comments: